

## Production of Cow's Milk on Purified Nutrients without Proteins\*

ARTTURI I. VIRTANEN and MARTTI LAMPILA

*Laboratory of the Foundation for Chemical Research, Biochemical Institute, Helsinki*

About a year ago investigations were started on the production of milk by feeding pure energy nutrients (cellulose + starch + sugar) in which urea- and ammonium-nitrogen were the sole sources of nitrogen except the small amount of nitrogen in the starch preparation and in the straw (*cf.* below). The mineral mixture was composed of pure salts; among the vitamins only A and D were given. 25 g of maize oil was given daily to the cows, but it will be reduced gradually in order that the cow's requirement of fat, and above all that of poly-unsaturated fatty acids, may be elucidated. In order to preserve the functioning of the rumen, we have had for the present to give the cow 2 kg of washed rye straw daily, but it seems possible to reduce this amount to 1 kg. The aim is to omit it completely, in which case even the last usual fodder would be omitted. The cow receives only about 1 g of N from 1 kg of straw, which is an insignificant amount as such. The starch preparation used contained 0.096 % N.

Two cows served as test animals. One of these (Pella II) calved on May 11, 1962; the weight of the vigorous calf being 37 kg. The highest midday milking was 11.7 kg after calving. Until the end of September, this cow produced 1.179 kg of milk with 5.5 % fat. The other cow will calf in the beginning of October.

The flavour of the milk (»zero milk») produced on this feeding is surprisingly similar to that of normal milk produced on ordinary feeding, although the fodder used for the production of normal milk contains widely different kinds of organic compounds and many flavour substances. Great differences between normal milk and »zero milk» were found by gas chromatography, but man's sense of taste and smell does not note these differences easily. Manysided investigations of the different components in the »zero milk» are being performed. The water-soluble vitamins in the milk samples so far investigated are on the same level in the »zero milk» as in normal milk.

During the test, the cow's dung has been light-coloured, and its smell has differed completely from that of normal dung. The urine has also been almost colourless and odourless. Special attention was given to the processes of fermentation and to the microbial flora in the rumen.

At the present moment it seems as if about 2000 l of milk could be produced per year on the above-mentioned test feeding. A test feeding like this makes it possible for the first time to investigate what nutrient factors are really needed for milk production, and what additions are needed to increase milk production.

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